NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

PRESCRIBED GRAZING

(Ac.)

CODE 528

DEFINITION

Managing the controlled harvest of vegetation with grazing animals.

PURPOSES

This practice may be applied as part of a conservation management system to accomplish one or more of the following purposes.

- Improve or maintain the health and vigor of plant communities.
- Improve or maintain quantity and quality of forage for livestock health and productivity.
- Improve or maintain water quality and quantity.
- Reduce accelerated soil erosion, and maintain or improve soil condition.
- Improve or maintain the quantity and quality of food and/or cover available for wildlife.
- Promote economic stability through grazing land sustainability.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all lands where grazing animals are managed.

CRITERIA

1. **Rotational Grazing/Intensive Grazing**

   Complete worksheets 1 and 2 in Appendix I to develop a grazing system that meets clients goals and the standards purposes.

   Complete worksheets 1 and 2 for spring pasture conditions and mid-summer pasture conditions.

2.. **Continuous Grazing (9 or more continuous grazing days/unit)**

   Complete worksheet 3 in Appendix 2 to determine pasture carrying capacity/stocking rate for mid-summer pasture conditions. If livestock numbers vary during the grazing season a worksheet will need to be completed for each herd size.

3.. **Stockpiled/Extended Grazing**

   Complete worksheet 4 in Appendix 3 to determine the number of grazing days available. Use references in Appendix 4 for developing specifications for managing tall fescue or brassica crops for winter grazing.

4. **Riparian Grazing**

   Use the Riparian Grazing Management supplement to develop a grazing plan when the client requests for these sensitive areas.

CRITERIA (All Grazing Systems)

5. Prepare a contingency plan to be followed to adjust the grazing plan in time of drought that is economically feasible without causing resource degradation.
6. Grazing height requirements will be based on Appendix 4.
7. A current soils test will be the basis for soil fertility management. Soil amendment requirements will follow the Nutrient Management (590) standard and should be applied to meet/maintain forage production goals.

Additional Criteria to Improve or Maintain Water Quality and Quantity

Minimize concentrated livestock areas to enhance nutrient distribution and improve or maintain ground cover.

Additional Criteria to Improve or Maintain Food and/or Cover for Wildlife Species of Concern

Manage plant height, structure and density for desired wildlife habitat using standard 645 Upland Wildlife Habitat Management.

Provide rest from grazing during critical nesting periods.

Additional Criteria to Promote Economic Stability through Grazing Land Sustainability.

Evaluate the economics of the forage system and associated infrastructure.

Develop a grazing system that provides forage for as much of the year as possible to minimize supplemental feed cost.

CONSIDERATIONS

Utilization or stubble height target levels are tools that can be used in conjunction with monitoring to help ensure that resource conservation and producer objectives are met.

When needed, rest areas for a period of time to ensure the success of brush control, seeding or other conservation practices.

Where practical, start the grazing sequence in a different management unit each growing season.

When weeds are a significant problem prescribed grazing should be implemented in conjunction with pest management to protect desired plant communities.

Livestock feeding, handling, and watering facilities should be designed and installed in a manner to improve and/or maintain animal distribution. These facilities should also be designed and installed to minimize stress, the spread of disease, parasites, contact with harmful organisms and toxic plants.

Supplemental feed and/or mineral requirements should be balanced with the forage consumption to meet the desired nutritional level for the kind and class of grazing livestock.

Prescribed grazing should consider the needs of other enterprises utilizing the same land, such as wildlife and recreational uses.

PLANS AND SPECIFICATIONS

Use the worksheet calculations to develop specifications for a prescribed grazing system. For situations where worksheet calculations are not supported by documented field results the conservation planner will obtain assistance from a NRCS grazing land specialist or State Agronomist to modify the worksheet values.

The following information, as a minimum will be provided to the client and documented in the conservation plan or contract.

1. Lengths of grazing and rest periods for each management unit.
2. Number of grazing management units, size and approximate locations.
3. Maximum number of livestock that can be grazing a management unit.
4. Beginning grazing heights and minimum height requirement of pasture forage during the grazing season.

5. Contingency plan to adjust grazing plan in time of drought, such as grazing haylands, feed supplemental hay or grain, reduce grazing demand by selling livestock, acquiring or renting additional acreage.
6. O&M plan with recordkeeping by producer.

OPERATION AND MAINTENANCE

Operation. Prescribed Grazing will be applied on a continuing basis throughout the occupation period of all grazing units.

Adjustments will be made as needed to ensure that height management, forage production, allowable soil loss levels, and economic stability of the prescribed grazing strategy are met.

Maintenance. All facilitating practices (i.e. Fence, Watering Facilities, Pest Management) that are needed to effect adequate grazing distribution as planned by this practice standard will be maintained in good working order.

As a minimum the producer must keep records on number of livestock/unit; grazing dates/unit; adjustments to size of unit; rest/ period/unit; size of unit; grass heights; and soil amendment application date.

The producer will insure that proper fertility levels for desired plant species are maintained. Soil amendments should be applied based on plant nutritional requirements and practicality of applying amendments due to steepness of slope.

528 - WV PRESCRIBED GRAZING
APPENDIX 1
ROTATIONAL GRAZING/INTENSIVE GRAZING

(WORKSHEETS 1 AND 2)

NRCS, NHCP
May 2002

NRCS-WV
June 2003

WORKSHEET NUMBER 1-- ESTIMATING CARRYING CAPACITY/STOCKING RATE -- ROTATIONAL GRAZING
How Many Acres Are Needed?

Cooperator Name _____ Farm Number _____

Prepared By _____ Date Prepared _____

STEP 1: DETERMINING FORAGE DEMAND

Determining Forage Demand/Day

A Animals	B Starting Weight	C Total Days Grazing[2]	D Desired ADG[3]	E Target Weight[4] (B + (C x D)) **or** Mature Animal Wt.	F Number of Animals	G Intake	H ForageRequired Per Day[5] (E x F x G)
Growing Animals						0.03	lbs DM
Cow/Calf [1]						0.03	lbs DM
Dry Cows						0.02	lbs DM
Bulls						0.025	lbs DM
Sheep/Lamb[1]						0.04	lbs DM
Dry Ewes						0.02	lbs DM
Other							lbs DM
					Total Required/Day		**_____lbs DM**

[1] Calves are included in forage demand for cows; lambs are included in forage demand for sheep.
[2] If mature animal is in good body condition, Desired ADG (D) is 0.
[3] Total Days Grazing are the total number of days the animals will be grazing, ie 200 days.
[4] Target Weight = Starting Weight plus (Days Grazing multiplied by ADG)
[5] Forage Required Per Day = Target Weight multiplied by Number of Animals multiplied by Intake

STEP 2: DETERMINING FORAGE AVAILABLE/UTILIZED

2a: Forage dry matter (dm) per acre available

Forage Type	Stand Condition[6] Pounds DM/Ac/Inch		
	Fair	**Good**	**Excellent**
Unimproved Pasture	50-100	100-200	--
Bluegrass/Clover	100-250	250-400	400-500
Tall grass/Legume	100-200	200-300	300-400
Tall Fescue	100-200	200-300	300-400
Alfalfa or Red Clover	150-200	200-250	250-300
Tall Warm Season	50-100	100-200	200-300
Other			

To calculate total forage/acre use the following formula:

Pounds DM/Ac/In multiplied by Pregrazing Height of Grass

[_____lbs DM/Ac/In **X** _____ In] **=**

_____ lbs DM/Acre Available

[6] **Fair** stand condition has less than 75% of ground covered. Plant species present are considered desirable species.
Good stand condition has 75-90% of ground covered. Plant species present are considered desirable species.
Excellent stand condition exceeds 90% of ground covered. Plant species present are considered desirable species.

Notes/Comments

continued on page 2

WORKSHEET 1 -- CARRYING CAPACITY/STOCKING RATE -- CONTINUED

2b: Forage dry matter (dm) per acre utilized

The available forage/ac to be utilized (consumed) depends on how many days the animals will be on the paddock. Refer to the following chart.

Approximate Utilization Rate	
Days on Field	Forage Consumed Percent of Total
1-2	75
3-4	70
5-6	60
7	55
8	45
9+	40

The formula is: **Percent Consumed multiplied by Total lbs DM/Ac Available**

[_____% **X** _____ lbs DM/Ac] **=** _____**lbs DM/Acre Utilized**
(step 2a)

STEP 3: HOW MANY PADDOCKS ARE NEEDED?

For estimating regrowth rates, local knowledge is best. If not available, use the following as a guide:
Spring/Early Summer 18-24 days; Mid-Summer 36-44 days.

The formula is: **(Days Required to Regrow to Desired Height divided by Days on Paddock) plus 1**

Spring [_____Days for Regrowth / _____Days on Paddock] + 1 = _____ **Paddocks**
(local knowledge) (landowner input)

Mid-Summer [_____Days for Regrowth / _____Days on Paddock] + 1 = _____ **Paddocks**
(local knowledge) (landowner input)

STEP 4: DETERMINE SIZE OF EACH PADDOCK

The formula is: **Forage Demand/Day multiplied by Number of Days on Paddock divided by Forage Utilized Per Acre**

[_____lbs DM/Day Required **X** _____Days] / _____lbs DM/Ac Utilized = _____ **Acres/Paddock**
(step 1) (landowner input) (step 2b)

STEP 5: DETERMINE TOTAL ACRES NEEDED

The formula is: **Paddock Size multiplied by Number of Paddocks**

Spring [_____Ac/Paddock **X** _____ Paddocks] = _____**Total Acres Required**
(step 4) (step 3)

Mid-Summer [_____Ac/Paddock **X** _____ Paddocks] = _____**Total Acres Required**
(step 4) (step 3)

Note: This form can be used to compare various options. For example, by changing the number of days on the paddock, the utilization rate will change, which will change the final answer.

Notes/Comments

WORKSHEET NUMBER 2 -- ESTIMATING CARRYING CAPACITY/STOCKING RATE -- ROTATIONAL GRAZING
How Many Animals Can Be Supported?

Cooperator Name _____ Farm Number _____ **SPRING / MID-SUMMER**

Prepared By _____ Date Prepared _____ (Circle one)

STEP 1: DETERMINING FORAGE AVAILABLE/UTILIZED

1a: Forage dry matter (dm) per acre available

Forage Type	Stand Condition[1] Pounds DM/Ac/Inch		
	Fair	Good	Excellent
Unimproved Pasture	50-100	100-200	--
Bluegrass/Clover	100-250	250-400	400-500
Tall grass/Legume	100-200	200-300	300-400
Tall Fescue	100-200	200-300	300-400
Alfalfa or Red Clover	150-200	200-250	250-300
Tall Warm Season	50-100	100-200	200-300
Other			

To calculate total forage/acre use the following formula:

Pounds DM/Ac/In multiplied by Pregrazing Height of Grass

[_____lbs DM/Ac/In **X** _____ In] **=**

_____ **lbs DM/Acre Available**

[1] **Fair** stand condition has less than 75% of ground covered. Plant species present are considered desirable species.
Good stand condition has 75-90% of ground covered. Plant species present are considered desirable species.
Excellent stand condition exceeds 90% of ground covered. Plant species present are considered desirable species.

1b: Forage dry matter (dm) per acre utilized

The available forage/ac to be utilized (consumed) depends on how many days the animals will be on the paddock. Refer to the following chart.

Approximate Utilization Rate	
Days on Field	Forage Consumed Percent of Total
1-2	75
3-4	70
5-6	60
7	55
8	45
9+	40

The formula is: **Percent Consumed multiplied by Total DM/Ac Available**

[_____% **X** _____ lbs DM/Ac] **=** _____**lbs DM/Acre Utilized**
(step 1a)

STEP 2: HOW MANY PADDOCKS ARE NEEDED?

For estimating regrowth rates, local knowledge is best. If not available, use the following as a guide:
Spring/Early Summer 18-24 days; Mid-Summer 36-44 days.

The formula is: **(Days Required to Regrow to Desired Height divided by Days on Paddock) plus 1**

[_____Days for Regrowth / _____Days on Paddock] + 1 = _____ **Paddocks**
(local knowledge) (landowner input)

Notes/Comments

continued on page 2

WORKSHEET 2 -- CARRYING CAPACITY/STOCKING RATE -- CONTINUED

STEP 3: ACRES IN EACH PADDOCK

The formula is: **Total Acres Available** **divided by** **Number of Paddocks**

[_____Acres / _____ Paddocks] = _____ **Acres/Paddock**
(step 2)

STEP 4: FORAGE PER PADDOCK

The formula is: **Acres per Paddock** **multiplied by** **Forage Utilized Per Acre**

[_____Acres/Paddock **X** _____lbs DM Utilized/Ac] = _____ **lbs DM/Paddock**
(step 3) (step 1b)

STEP 5: DETERMINE FORAGE AVAILABLE PER DAY

The formula is: **Forage Available/Paddock** **divided by** **Number of Days On Paddock**

[_____lbs DM/Paddock / _____Days on Paddocks] = _____**lbs DM Available/Day**
(step 4) (table, step 1b)

STEP 6: BALANCE LBS DM AVAILABLE PER DAY TO DEMAND PER DAY

Procedure:
1. Determine the class of animal (A) - this determines the intake rate (%BW).
2. For **Growing Animals**--enter Starting Weight (B), Desired ADG (C) and Total Days Grazing (D).
3. Estimate theTarget Weight of the Animal (E). Target Weight = Starting weight plus (ADG multiplied by Total Days Grazing)
4. For **Mature Animals**-- If animal is in good body condition, Desired ADG (C) is 0 or go directly to (E) Mature Animal Weight.
5. Intake (F) -- Calves are included in forage demand for cows; lambs are included in forage demand for sheep.
6. Estimate Forage DM Demand/Day (G). Forage DM Demand/Day=Target Weight or Mature Animal Weight multiplied by Intake.
7. Forage DM Available per Day (from step 5) (H) divided by Forage DM Demand per Day (G) = Number of Animals (I).

A Animals	B Starting Weight	C Desired ADG	D Total Days Grazing	E Target Weight (B + (C x D)) **or** Mature Ani. Wt.	F Intake	G Forage DM Demand/Day (E x F)	H Forage DM Available/Day (step 5)	I Number of Animals (H / G)
Growing Animals					0.03			
Cow/Calf					0.03			
Dry Cows					0.02			
Bulls					0.025			
Sheep/Lamb					0.04			
Dry Ewes					0.02			
Other								
Total [2]						_____	_____	_____

[2] **CAUTION:** Total forage demand/day of all classes cannot exceed total forage available per day (from step 5).

Note: This form can be used to compare various options. For example, by changing the number of days on the paddock, the utilization rate will change, which will change the final answer. Also, the regrowth time, as well as the animal weight, may differ during over the grazing season (April, May vs. July, Aug., etc). Use multiple worksheets to display differences.

Notes/Comments

528 - WV PRESCRIBED GRAZING
APPENDIX 2
CARRYING CAPACITY/STOCKING RATES – CONTINIOUS GRAZING

(WORKSHEET 3)

NRCS, NHCP
June 1994

NRCS-WV
June 2003

WORKSHEET NUMBER 3 -- ESTIMATING CARRYING CAPACITY/STOCKING RATE--CONTINUOUS GRAZING

Cooperator Name _____ Farm Number_____

Prepared By: _____ Date Prepared_____

Step 1 - Estimate Pounds of Liveweight/Farm

The formula is:

(Annual Forage Production (Table 1.) multiplied by Acres of the Farm) divided by

(Average Daily Intake (Table 2.) multiplied by Length of Grazing Season)

[_____lbs DM/Ac **X** _____Ac/Farm] / [_____ Intake (lbs DM/lb Liveweight/Day) **X** _____Days] =

(Table 1.) (Table 2.)

_____lbs of Liveweight/Farm

Table 1. Annual Forage Production

Forage Type	Stand Condition[1] Pounds DM/Ac[2]		
	Fair	Good	Excellent
Unimproved Pasture	300-600	600-1200	--
Bluegrass/clover	600-1500	1500-2400	2400-3000
Tall grass/legume	1200-2400	2400-3600	3600-4800
Tall Fescue	1200-2400	2400-3600	3600-4800
Alfalfa or Red Clover	1800-2400	2400-3000	3000-3600
Other			

Table 2. Average Daily Intake

Animal	Intake
Growing Animals	0.03
Cow/calf [3]	0.03
Dry Cows	0.02
Bulls	0.025
Sheep/lambs [3]	0.04
Dry Ewes	0.02
Other	

[1] **Fair** stand condition has less than 75% of ground covered. Plant species present are considered desirable species.
Good stand condition has 75-90% of ground covered. Plant species present are considered desirable species.
Excellent stand condition exceeds 90% of ground covered. Plant species present are considered desirable species.

[2] Pounds of Dry Matter per Acre have been adjusted to account for seasonal growth and utilization rate.

[3] Calves are included in forage demand for cows; lambs are included in forage demand for sheep.

Notes:

Step 2 - Estimate Number of Animals

The formula is:

Total Liveweight/Farm divided by Weight of one Animal

[_____lbs Liveweight/Farm / _____lbs Ani. Wt.] = _____ **Number of Animals that can be supported for the Grazing Season**[4]

(Step 1)

[4] Use the same class animal that you used in Step 1 (cow, bulls, etc.). If more than one animal class is being planned, determine the right balance by "trial and error". Also, total liveweight/farm is based on the entire grazing season and does not consider seasonal growth patterns of forages. It is possible to have a higher carrying capacity for the grazing season than what is capable mid-year.

528 - WV PRESCRIBED GRAZING
APPENDIX 3
ESTIMATING DAYS OF STOPCKPILED FORAGE AVAILABLE – EXTENDED GRAZING

(WORKSHEET 4)

NRCS, NHCP
June 1994

NRCS-WV
June 2003

WORKSHEET NUMBER 4 -- ESTIMATING DAYS OF STOCKPILED FORAGE AVAILABLE

Cooperator Name _____ Farm Number _____
Prepared By _____ Date _____

This worksheet is designed as a way to estimate the total number of days available for grazing a stockpiled area. Normally, a cooperator has a set number of animals that will be grazing a set acreage that has been stockpiled. The formula can be interchanged to determine other data--number of acres needed, number of animals, etc - simply by inserting the known data and solving for the desired information.

Step 1. Determine Forage Available

1a. Estimate lbs of DM/Acre. The formula is:
Forage Density (Table 1.) **multiplied by** **Height at Turn-in** [1]

[_____lbs/Ac/Inch (Table 1.) **X** _____Inches] = _____**lbs DM/Ac**

1b. Estimate lbs of DM Available. The formula is:
Ac Stockpiled **multiplied by** **lb DM/Ac** **multiplied by** **Utilization Rate** (Table 2.)

[_____ Ac **X** _____lb DM/Ac (step 1a) **X** _____% Utiliz. (Table 2.)] = _____**lbs DM Available**

[1] Turn in height is highly variable. With N and adequate rainfall, the forage should be at least 12 inches tall after 90 days of stockpiling.

Step 2. Determine Forage Demand

The formula is: **Number of Animals (B)** **multiplied by** **Animal Weight (C)** **multiplied by** **Intake (D)**

A Animal	B Number of Animals	C Animal Weight	D Intake	E Lbs DM Required Per Day (B x C x D)
Growing Animals			0.03	
Cow/Calf [3]			0.03	
Dry Cows			0.02	
Bulls			0.025	
Sheep/Lamb[3]			0.04	
Dry Ewes			0.02	
Other				
			Total Required/Day	_____**lbs DM**

[3] Calves are included in forage demand for cows; Lambs are included in demand for sheep.

Step 3. Estimate the Number of Grazing Days Available

The formula is: **DM Available** (step 1b) **divided by** **Forage Demand/Day** (step 2)

[_____lbs DM Available (step 1b) / _____lbs Total Forage DM Demand/Day (step 2)] =

_____**Approx. Grazing Days Available**

Table 1. Forage Density

Forage Type	Stand Condition[2] Pounds DM/Ac/Inch		
	Fair	Good	Excellent
Bluegrass/Clover	100-250	250-400	400-500
Orchardgrass/Legume	100-200	200-300	300-400
Tall Fescue/Legume	100-200	200-300	300-400
Tall Fescue/Nitrogen	150-250	250-350	350-450
Other			

[2] Fair Stand Condition: <75% ground covered.
Good Stand Condition = 75-90% ground covered.
Excellent Stand Condition: >90% ground covered.
Note: Plant species present are considered desirable.

Table 2. Approx. Utilization Rate

Days on Field	Utilization Rate (Forage Consumed-- Percent of Total)
1-2	75
3-4	70
5-6	60
7	55
8	45
9+	40

Notes/Comments

_____
_____
_____
_____
_____

528 - WV PRESCRIBED GRAZING
APPENDIX 4
GRAZING GUIDE

NRCS, NHCP
June 1994

NRCS-WV
June 2003

Appendix 4 - Grazing Guide

Listed below are the grazing height requirements. These guidelines allow the forage resource to be maintained at the desired level.

An exception to these heights is for Management Intensive Grazing (MIG) operations. If the producer delays initial turnout until these heights are reached, then the successive paddocks will be too mature. Livestock can begin initial grazing of bluegrass pastures at 2-3 inches; orchardgrass, fescue at 4-5 inches for a MIG.

Species 1/	Stage of Growth To Start Grazing	Successive Grazings	Remove Livestock When Height of Grazed Stubble Is	Minimum Over-Winter Height
Bluegrass	4-5" high (April 20-May 10) for most of West Virginia	Following a 4-5 inch regrowth	1-2 inches	2"
Orchardgrass, tall fescue, and other non jointed grass	8" high and from boot to early head	Following 8-10 inch recovery growth	2-3 inches	3"
Smooth Brome, Timothy, Reed canary and other jointed grasses (spring/summer)	Before jointing and between early to full head, except smooth brome - medium to full head	8-10 inch recovery	2-3 inches	4"
Alfalfa 2/	Full bud	1/4 bloom or 5-6 weeks recovery	2-3 inches	6"
Birdsfoot Trefoil 2/	1/4 bloom	1/4 bloom or 6-8 week recovery	2-3 inches	3"
Ladino 2/	1/4 to 1/2 bloom or 8-10 inch high	8-10 inch high;ladino should be 1/4 to 1/2 bloom before last grazing	2 inches	3"
Orchardgrass, tall fescue, and other non jointed grass (Extended Grazing)	12-18" high after 1st frost	-----	2-3 inches	2"

Appendix 4 - Grazing Guide

Species	Stage of Growth To Start Grazing in Spring	Successive Grazings	Remove Livestock When Height of Grazed Stubble Is	Over-Winter Height
Red and Alsike Clover	1/4-1/2 bloom	1/4 bloom	2 inches	3"
Crownvetch 2/	Early bloom	Early bloom	2-3 inches	5"
Sudan grass 2/	18"		4 inches	---
Sudan grass 2/ hybrid	30"		4 inches	---
Small Grain 2/	8-10 inches	Winter grain to be harvested for grain should not be grazed after 4/15 for most of WV	3 inches	---
Switchgrass 2/ and Big Bluestem	18-24 inches high. Stage of growth between jointing and formulation of a seed head in the stem boot	18-24 inch recovery	8 inches	8"
Caucasian 2/ Bluestem	14-18" high. Stage of growth between jointing and formulation of seed head in the stem boot	14-18 inch recovery growth	6 inches	6"

1/ Grazing of grass-legume mixtures should be governed by height of the dominant species.

2/ These are suited for rotational grazing only. Alfalfa and birdsfoot trefoil should reach maturity at least once during season to prolong life of stand.